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EXAMINER	
NGUYEN, HOAN C	
ART UNIT	PAPER NUMBER
2871	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/891,997	YAGI ET AL.	
	Examiner	Art Unit	
	HOAN C. NGUYEN	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 February 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26 and 29-48* is/are pending in the application.

4a) Of the above claim(s) *6-26 and 30-43* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5, 29 and 44-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☒ Other: _____.

DETAILED ACTION

Response to Amendment

Applicant's arguments with respect to claims 1-5, 29 and 44-48 based on the Response filed on 02/16/2007 have been considered but are in the old ground(s) of rejection. Therefore, this is Final action.

In last office actions, examiner did not mention "renaming produces unacceptable visual effects". Examiner mentioned that the primary reference Yamagishi (US4920409A) is still proper for rejection since (1) "scanning" electrode and "signal" electrode are only labels, which can be swapped or interchanged; (2) Yamagishi based on prior of figure 1 to modify to form a matrix type color liquid crystal display. However, for instant application, Figure 1 of Yamagishi does not disclose the resetting process, in which the pixel corresponding to the selected first scanning first electrode is not display as claims 47-48 cited. Therefore, the last second non-final is in moot of new ground of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1-5, 29 and 44-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamagishi (US4920409A) in view of **Yoneda et al.** (US6954195B2).

In regard to claims 1 and 47-48, Yamagishi discloses (Fig. 1) all features in claims 1-3 and 47 except for inversely arrangement of the scanning and signal lines. **Here, scanning electrodes (C1-C3) are interchanged with signal electrodes (R1-R7) in reference of Yamagishi for vertical and horizontal choices. In another words, scanning electrodes C1-C3 can be renamed to be signal electrodes and signal electrodes R1-R7 can be renamed to be scanning electrodes. The renamed electrodes will not change any property of display. [as discussed in Office Action mailed on 9/23/04, 4/20/2004 and 5/2/2005].**

Therefore, a liquid crystal display apparatus comprising:

- a liquid crystal layer comprising liquid crystal and having a plurality of pixels, where scanning electrodes cross the signal electrodes, arranged in a matrix composed of rows and columns;
- a number of first scanning electrodes Y1-Y7 according to electrode R1-R7 aligned in a first direction at a first pitch (between Y_i and Y_j, where i and j = 1-7), the number of the first scanning electrodes corresponding to a number of rows and each of the first scanning electrodes extending in a second direction substantially orthogonal to the first direction (y-direction);
- a plurality of signal electrodes X1-X3 according to electrode C1-C3 facing the first scanning electrodes with the liquid crystal layer sandwiched between the signal electrodes and the first scanning electrodes, the signal electrodes being

aligned in the second direction (X-direction) at a second pitch (between X_m and X_n, where n and m = 1-3) wider than the first pitch and each of the signal electrodes extending in the first direction.

- a scanning electrode driver connected to the first scanning electrodes;
- a signal electrode driver connected to the signal electrode;

Claim 2:

- pixels are formed at intersections of the first scanning electrodes and the signal electrodes; and each of the pixels is a rectangle of which shorter sides are parallel to the first direction and of which longer sides are parallel to the second direction.

Claim 3:

- a width of each of the first scanning electrodes defines a length of the shorter sides of each of the pixels; and a width of each of the signal electrodes defines a length of the longer sides of each of the pixels.

Claim 4-5:

- the first pitch is 1/n of the second pitch, wherein n is 2.

Claim 44:

- all of pixels can display a same color for reducing cost due to less expensive for one color display than for three color display.

However, Yamagishi fails to discloses a liquid crystal display apparatus with (a) the liquid crystal having a memory effect, exhibiting a cholesteric phase and comprising

a nematic liquid crystal compound and a chiral agent; (b) a controller for controlling the scanning electrode driver and the scanning electrode driver such that the scanning electrode driver selects the first scanning electrodes in a specified order by outputting a selective signal to each of the first scanning electrodes and the signal electrode driver outputs signals to the plurality of signal electrodes in accordance with image data to display the pixels on the row of the matrix corresponding to the selected scanning electrode wherein while each of the first scanning electrodes is being selected, the pixel corresponding to the selected first scanning first electrode are not display (claims 1 and 45-48).

Yoneda et al. teach a liquid crystal display apparatus with (a) the liquid crystal having a memory effect, exhibiting a cholesteric phase and comprising a nematic liquid crystal compound and a chiral agent; (b) a controller for controlling the scanning electrode driver and the scanning electrode driver such that the scanning electrode driver selects the first scanning electrodes in a specified order by outputting a selective signal to each of the first scanning electrodes and the signal electrode driver outputs signals to the plurality of signal electrodes in accordance with image data to display the pixels on the row of the matrix corresponding to the selected scanning electrode wherein while each of the first scanning electrodes is being selected, the pixel corresponding to the selected first scanning first electrode are not display (claims 1 and 45-48, claims 45-46 inherently illustrated in Fig. 8, see ***Response to Arguments*** below).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to rearrange the scanning and signal lines for designed choice of vertical and horizontal images, since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70; wherein the liquid crystal having a memory effect, exhibiting a cholesteric phase and comprising a nematic liquid crystal compound and a chiral agent for comsuming less power (col. 3 lines 17-20); a controller for controlling the scanning electrode driver and the scanning electrode driver such that the scanning electrode driver selects the first scanning electrodes in a specified order by outputting a selective signal to each of the first scanning electrodes and the signal electrode driver outputs signals to the plurality of signal electrodes in accordance with image data to display the pixels on the row of the matrix corresponding to the selected scanning electrode wherein while each of the first scanning electrodes is being selected, the pixel corresponding to the selected first scanning first electrode are not display (claims 1 and 45-48) for high speed writing,achieving easy-to-see screen (col. 2 lines 1-11) as taught by Yoneda et al.

2. Claims 1-5, 29 and 44-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamagishi (US4920409A) in view of **Yamakawa et al.** (US6697039B1).

In regard to claims 1 and 47-48, Yamagishi discloses (Fig. 1) all features in claims 1-3 and 47 except for inversely arrangement of the scanning and signal lines. **Here, scanning electrodes (C1-C3) are interchanged with signal electrodes (R1-**

R7) in reference of Yamagishi for vertical and horizontal choices. In another words, scanning electrodes C1-C3 can be renamed to be signal electrodes and signal electrodes R1-R7 can be renamed to be scanning electrodes. The renamed electrodes will not change any property of display. [as discussed in Office Action mailed on 9/23/04, 4/20/2004 and 5/2/2005].

Therefore, a liquid crystal display apparatus comprising:

- a liquid crystal layer comprising liquid crystal and having a plurality of pixels, where scanning electrodes cross the signal electrodes, arranged in a matrix composed of rows and columns;
- a number of first scanning electrodes Y1-Y7 according to electrode R1-R7 aligned in a first direction at a first pitch (between Y_i and Y_j, where i and j = 1-7), the number of the first scanning electrodes corresponding to a number of rows and each of the first scanning electrodes extending in a second direction substantially orthogonal to the first direction (y-direction);
- a plurality of signal electrodes X1-X3 according to electrode C1-C3 facing the first scanning electrodes with the liquid crystal layer sandwiched between the signal electrodes and the first scanning electrodes, the signal electrodes being aligned in the second direction (X-direction) at a second pitch (between X_m and X_n, where n and m = 1-3) wider than the first pitch and each of the signal electrodes extending in the first direction.
- a scanning electrode driver connected to the first scanning electrodes;
- a signal electrode driver connected to the signal electrode;

Claim 2:

- pixels are formed at intersections of the first scanning electrodes and the signal electrodes; and each of the pixels is a rectangle of which shorter sides are parallel to the first direction and of which longer sides are parallel to the second direction.

Claim 3:

- a width of each of the first scanning electrodes defines a length of the shorter sides of each of the pixels; and a width of each of the signal electrodes defines a length of the longer sides of each of the pixels.

Claim 4-5:

- the first pitch is 1/n of the second pitch, wherein n is 2.

Claim 44:

- all of pixels can display a same color for reducing cost due to less expensive for one color display than for three color display.

However, Yamagishi fails to discloses a liquid crystal display apparatus with (a) the liquid crystal having a memory effect, exhibiting a cholesteric phase and comprising a nematic liquid crystal compound and a chiral agent; (b) a controller for controlling the scanning electrode driver and the scanning electrode driver such that the scanning electrode driver selects the first scanning electrodes in a specified order by outputting a selective signal to each of the first scanning electrodes and the signal electrode driver outputs signals to the plurality of signal electrodes in accordance with image data to

display the pixels on the row of the matrix corresponding to the selected scanning electrode wherein while each of the first scanning electrodes is being selected, the pixel corresponding to the selected first scanning first electrode are not display (claims 1 and 45-48).

Yamakawa et al. teach a liquid crystal display apparatus with (a) the liquid crystal having a memory effect, exhibiting a cholesteric phase and comprising a nematic liquid crystal compound and a chiral agent; (b) a controller for controlling the scanning electrode driver and the scanning electrode driver such that the scanning electrode driver selects the first scanning electrodes in a specified order by outputting a selective signal to each of the first scanning electrodes and the signal electrode driver outputs signals to the plurality of signal electrodes in accordance with image data to display the pixels on the row of the matrix corresponding to the selected scanning electrode wherein while each of the first scanning electrodes is being selected, the pixel corresponding to the selected first scanning first electrode are not display (claims 1 and 45-48, claims 45-46 inherently illustrated in Tables 1-2, see ***Response to Arguments*** below).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to rearrange the scanning and signal lines for designed choice of vertical and horizontal images, since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70; wherein the liquid crystal having a memory effect, exhibiting a cholesteric phase and comprising a

nematic liquid crystal compound and a chiral agent for comsuming less power supply and obtaining large screen (col. 2 lines 44-59); a controller for controlling the scanning electrode driver and the scanning electrode driver such that the scanning electrode driver selects the first scanning electrodes in a specified order by outputting a selective signal to each of the first scanning electrodes and the signal electrode driver outputs signals to the plurality of signal electrodes in accordance with image data to display the pixels on the row of the matrix corresponding to the selected scanning electrode wherein while each of the first scanning electrodes is being selected, the pixel corresponding to the selected first scanning first electrode are not display (resetting state) for reducing time of rewriting where resetting is sequentially performed for each scanning electrode as taught by Yamakawa et al.

3. Claims 1-5, 29 and 44-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamagishi (US4920409A) in view of Masazumi (US6414669B1) and **Kimura (US5602559A)**.

In regard to claims 1 and 47-48, Yamagishi discloses (Fig. 1) all features in claims 1-3 and 47 except for inversely arrangement of the scanning and signal lines. **Here, scanning electrodes (C1-C3) are interchanged with signal electrodes (R1-R7) in reference of Yamagishi for vertical and horizontal choices. In another words, scanning electrodes C1-C3 can be renamed to be signal electrodes and signal electrodes R1-R7 can be renamed to be scanning electrodes. The renamed**

electrodes will not change any property of display [as discussed in Office Action mailed on 9/23/04, 4/20/2004 and 5/2/2005].

Therefore, a liquid crystal display apparatus comprising:

- a liquid crystal layer comprising liquid crystal and having a plurality of pixels, where scanning electrodes cross the signal electrodes, arranged in a matrix composed of rows and columns;
- a number of first scanning electrodes Y1-Y7 according to electrode R1-R7 aligned in a first direction at a first pitch (between Y_i and Y_j, where i and j = 1-7), the number of the first scanning electrodes corresponding to a number of rows and each of the first scanning electrodes extending in a second direction substantially orthogonal to the first direction (y-direction);
- a plurality of signal electrodes X1-X3 according to electrode C1-C3 facing the first scanning electrodes with the liquid crystal layer sandwiched between the signal electrodes and the first scanning electrodes, the signal electrodes being aligned in the second direction (X-direction) at a second pitch (between X_m and X_n, where n and m = 1-3) wider than the first pitch and each of the signal electrodes extending in the first direction.
- a scanning electrode driver connected to the first scanning electrodes;
- a signal electrode driver connected to the signal electrode;

Claim 2:

- pixels are formed at intersections of the first scanning electrodes and the signal electrodes; and each of the pixels is a rectangle of which shorter sides are

parallel to the first direction and of which longer sides are parallel to the second direction.

Claim 3:

- a width of each of the first scanning electrodes defines a length of the shorter sides of each of the pixels; and a width of each of the signal electrodes defines a length of the longer sides of each of the pixels.

Claim 4-5:

- the first pitch is 1/n of the second pitch, wherein n is 2.

Claim 44:

- all of pixels can display a same color for reducing cost due to less expensive for one color display than for three color display.

However, Yamagishi fails to discloses a liquid crystal display apparatus with (a) the liquid crystal having a memory effect, exhibiting a cholesteric phase and comprising a nematic liquid crystal compound and a chiral agent; (b) a controller for controlling the scanning electrode driver and the scanning electrode driver such that the scanning electrode driver selects the first scanning electrodes in a specified order by outputting a selective signal to each of the first scanning electrodes and the signal electrode driver outputs signals to the plurality of signal electrodes in accordance with image data to display the pixels on the row of the matrix corresponding to the selected scanning electrode wherein while each of the first scanning electrodes is being selected, the

pixel corresponding to the selected first scanning first electrode are not display (claims 1 and 45-48).

Masazumi teaches a liquid crystal display apparatus comprising the liquid crystal having a memory effect wherein the liquid crystal exhibits a cholesteric phase and comprises a nematic liquid crystal compound and a chiral agent (claim 29) retaining the display states of the liquid crystals if the deselect signal is held below the prescribed threshold voltage.

Kimura teaches a liquid crystal display apparatus with a controller for controlling the scanning electrode driver and the scanning electrode driver such that the scanning electrode driver selects the first scanning electrodes in a specified order by outputting a selective signal to each of the first scanning electrodes and the signal electrode driver outputs signals to the plurality of signal electrodes in accordance with image data to display the pixels on the row of the matrix corresponding to the selected scanning electrode wherein while each of the first scanning electrodes is being selected, the pixel corresponding to the selected first scanning first electrode are not display (claims 1 and 45-48, claims 45-46 are inherently illustrated in Figs. 3-5, see ***Response to Arguments*** below).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to rearrange the scanning and signal lines for designed choice of vertical and horizontal images, since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70; wherein (a)

the liquid crystal having a memory effect, exhibiting a cholesteric phase and comprising a nematic liquid crystal compound and a chiral agent for comsuming less power supply and obtaining large screen (col. 2 lines 33-34) as taught by Masazumi; (b) a controller for controlling the scanning electrode driver and the scanning electrode driver such that the scanning electrode driver selects the first scanning electrodes in a specified order by outputting a selective signal to each of the first scanning electrodes and the signal electrode driver outputs signals to the plurality of signal electrodes in accordance with image data to display the pixels on the row of the matrix corresponding to the selected scanning electrode wherein while each of the first scanning electrodes is being selected, the pixel corresponding to the selected first scanning first electrode are not display (resetting state) for achieving multi-graduation display (col. 3 lines 44-67) as taught by **Kimura**.

Response to Arguments

Applicant's arguments filed on 02/16/2007 have been fully considered but they are not persuasive.

Applicant's arguments:

(1) Examiner modified Yamagishi (US4920409A) by interchanging or swapping (or another word, renaming) scanning electrodes and signal electrodes. Using color images red/blue/green, applicants illustrate that the swapped or interchanged electrodes will change any property of display.

(2) The scanning electrodes are traditionally horizontal is clearly illustrated by the fact that Yamagishi, Yoneda, Yamakawa, and Kimura each disclose horizontal, not vertical, scan lines.

(3) The Office Action has utterly failed to provide any indication as to where Yamagishi or Yoneda disclose or suggest the limitations of claims 45 and 46, the Office Action has not raised a *prima facie* case of obviousness, and thus claims 45 and 46 are considered nonobvious over the cited combination of Yamagishi and Yoneda.

Examiner's responses:

(1) First, Yamagishi discloses (fig. 1) a set of electrodes including the stripped-shape common electrodes C1-C3 and the segment electrodes R1-R7. Fig. 1 also shows that the width of the common electrodes C1-C3 approximately is twice of the width of the segment electrodes R1-R7. Therefore, Fig. 1 shows the pitch of the common electrodes C1-C3 approximately is twice of the pitch of the segment electrodes R1-R7.

In the Prior Art Yamagishi, the common electrode C1-C3 would connect to the scanning drivers, thus the common electrodes C1-C3 consider as scanning electrodes; the segment electrodes R1-R7 would connect to the signal drivers, thus the segment electrodes R1-R7 consider as the signal electrodes (see attachment 1).

In modifying the Prior Art Yamagishi, examiner interchanges or swaps the common electrodes with the segment electrodes. The segment electrodes R1-R7 now connect to the scanning driver, thus the segment electrodes R1-R7 will consider as scanning electrodes; the common electrodes C1-C3 now connect to the signal drivers, thus the common electrodes C1-C3 will consider as the signal electrodes (see

attachment 2). The attachment 2 shows the pitch of scanning electrodes C1-C3 is approximately twice of the pitch of signal electrodes R1-R7; thus n=2 as cited in claims 4-5.

The same modification can be applied to Figs. 2-3 of Prior Art Yamagishi, se attachment 3.

(2) The scanning electrodes are not traditionally or conventionally horizontal, the scanning electrodes must conventionally connect to the scanning drivers, not horizontal or vertical configuration. Examiner illustrates the scanning in horizontal configuration if the set of electrodes of the modified Prior Art rotate 90 degrees (see attachment 2). This interchange or swapping between electrodes will resolve the argument of claim 2.

(3) At certain time, the scanning electrodes on upper substrate conventionally or inherently have higher voltage (signal output) than the signal electrodes on the bottom substrate to generate the electric potential through the liquid crystal layer to modulate the light passing through. The voltage of scanning electrodes and signal electrodes are inherently variation when displaying image.

Besides, Yoneda illustrates these inherent behavior of voltage or (signal output) of scanning electrodes or the signal electrodes in Fig. 8 which shows that the signal output of scanning electrodes (row output) is higher than the signal output of signal electrodes (column output).at beginning and vary to become smaller the later time. Yamakawa illustrates these inherent behavior of voltage or (signal output) of scanning

electrodes or the signal electrodes in TABLE 1-2. Kimura illustrates in Fig. 3 that the scanning signal (V_s selection) is higher than data signal (0 or 1/2 V_s) at later time, and the scanning signal and data signal are varied in time as shown in Fig. 5A.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HOAN C. NGUYEN whose telephone number is (571) 272-2296. The examiner can normally be reached on MONDAY-THURSDAY:8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

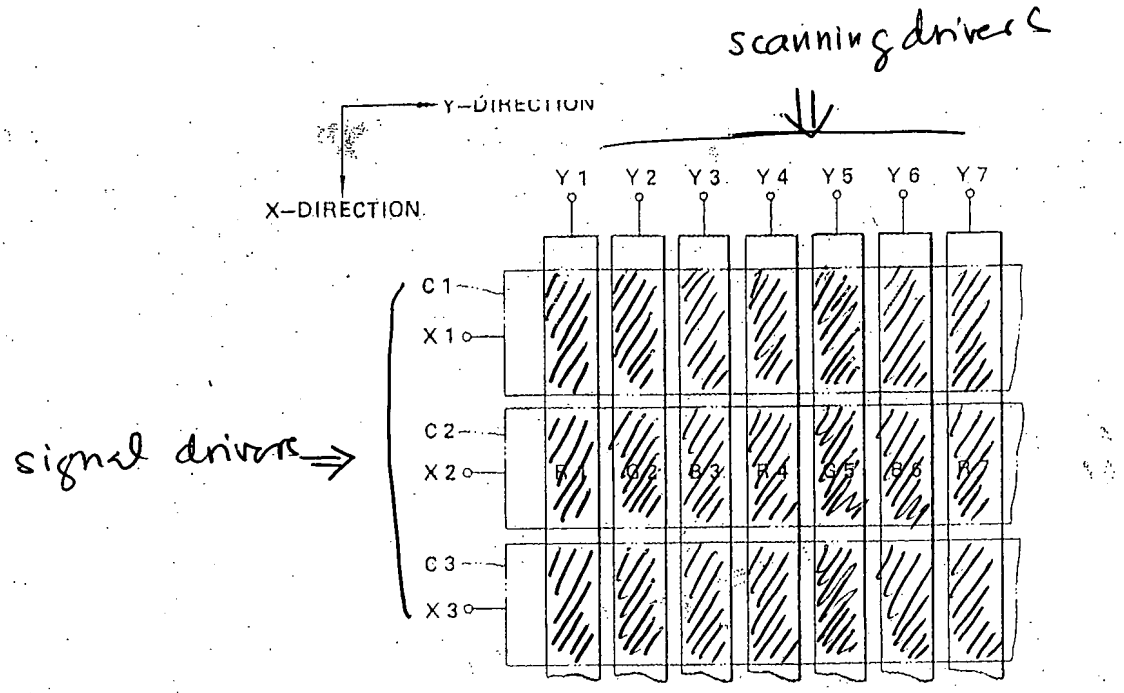
HOAN C. NGUYEN
Examiner
Art Unit 2871

chn

ANDREW SCHECHTER
PRIMARY EXAMINER

Attachment 1

Prior Art (Yamagishi)



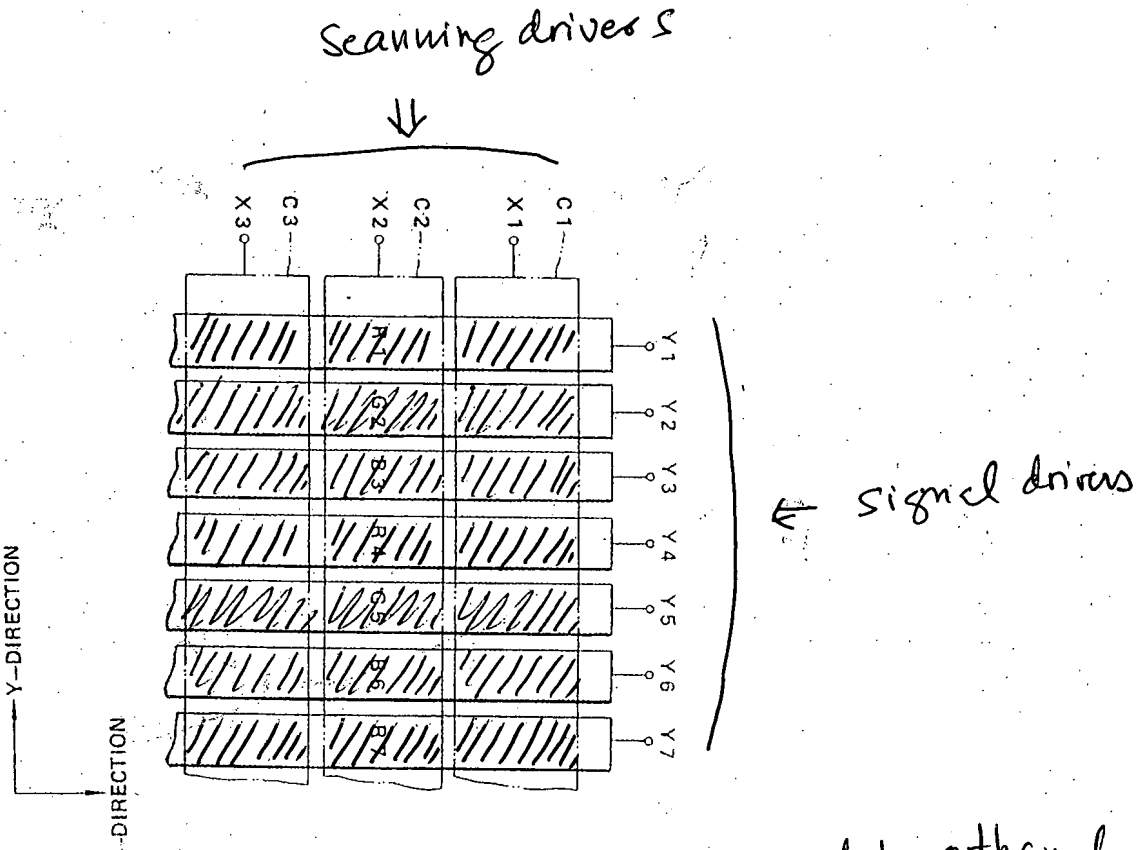
The common electrodes $C_1 - C_3$ connect to scanning drivers

$\Rightarrow$ the common electrodes $C_1 - C_3$ considers as scanning electrodes

The segment electrodes $R_1 - R_7$ connects to signal drivers $\Rightarrow$ the segment electrodes $R_1 - R_7$ considers as signal electrodes

Attachment 2

Modified Prior Art: renamed or interchanged common electrodes and segment electrodes:

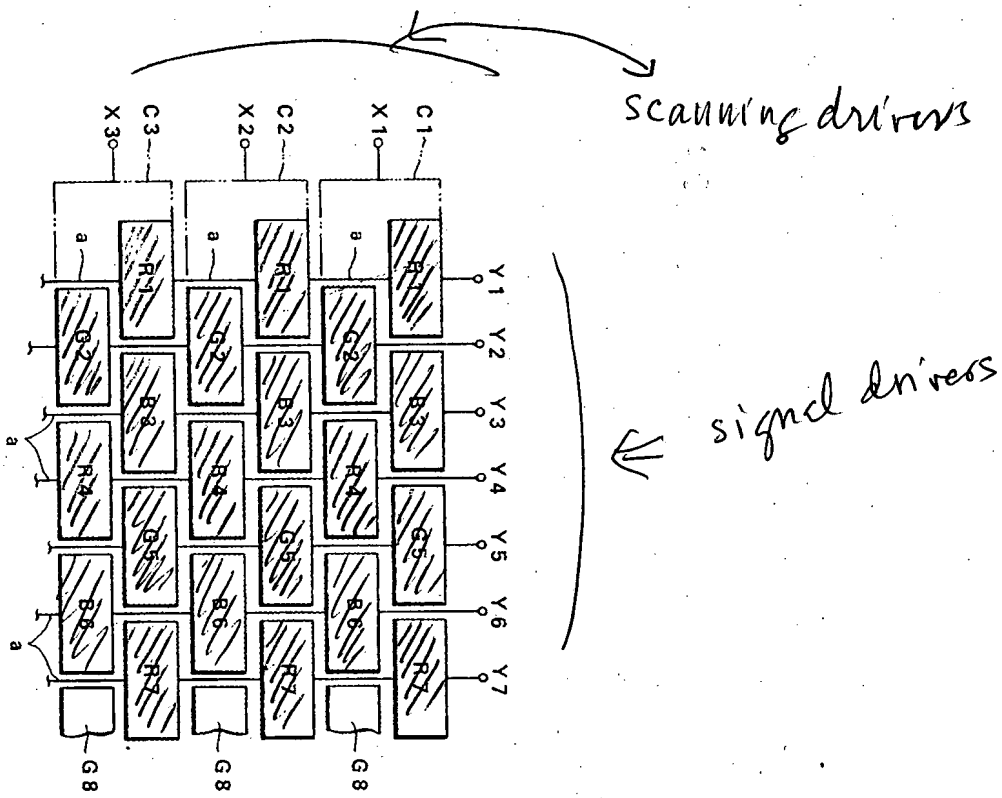


① The segment electrodes R_1-R_7 connect to 'scanning drivers through Y_1-Y_7 terminals ⇒ The segment electrodes R_1-R_7 considers as scanning electrodes.

② The common electrodes C_1-C_3 connects to signal drivers through X_1-X_3 terminals ⇒ The common electrodes C_1-C_3 considers as signal electrodes

Attachment 3

Modified Fig 2



Modified Fig 3